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The official announcements and other circular matter connected with the Congress will be distributed through the American committee as soon as the documents are received from Berlin. Any members of the society to whom these circulars may not be sent can secure them by writing to the chairman of the American committee.

Chemists not members of the American Chemical Society are also cordially invited to participate in the Congress both as members and as authors of papers, and the same courtesies will be extended to them, if so desired, as are offered above.

H. W. WILEY,
Member of Permanent Committee on Organization and Chairman of American Committee.

SCIENTIFIC BOOKS.

RECENT PAPERS ON THE EMBRYOLOGY, STRUCTURE AND HABITS OF LIVING BRACHIOPODA.

1. *Observations on Living Brachiopoda.* By EDWARD S. MORSE. Memoirs Boston Soc. Nat. Hist., Vol. 5, No. 8, 1902. 4to. Pp. 313–386; pls. 39–61.
2. *The Embryology of a Brachiopod, Terebratulina septentrionalis Couthouy.* By EDWIN G. CONKLIN. Proc. Amer. Phil. Soc., Vol. 41, No. 168, 1902. 8vo. Pp. 41–76; pls. 1–10.
3. *On the Development of Lingula anatina.* By NAOHIDÉ YATSU. Jour. College of Science, Imp. Univ. Tōkyō, Japan, Vol. 17. Art. 4, 1902. 8vo. Pp. 1–112; pls. 1–8.
4. *Notes on the Histology of Lingula anatina Brugière.* By NAOHIDÉ YATSU. *Ibid.*, Vol. 17, Art. 5, 1902. 8vo. Pp. 1–29; pls. 1, 2.
5. *On the Habits of the Japanese Lingula.* By NAOHIDÉ YATSU. Annotationes Zoologicæ Japonensis, Vol. 4, Pt. 2, 1902. 8vo. Pp. 61–67.

The publication of studies on living Brachiopoda seems to have become almost epidemic during the present year. Sporadic papers have appeared during the past ten years, but no marked infection has occurred until now. The results are most satisfactory, for the contributions here noticed are of a high degree of excellence and constitute a decided advance in our knowledge of the habits, anatomy and embryology of this interesting class, whose culmination was attained far back in the Paleozoic era.

Professor Morse possesses the unique distinction of having first studied the early stages and embryology of a brachiopod. His observations on the embryology of *Terebratulina* and the systematic position of the Brachiopoda were published thirty years ago. The importance of the subject led him to visit Japan, where the adjacent seas offer the greatest inducement to the student of the recent species of this class. The allurements of Japanese art have prevented the publication of the studies then made until the present time. It is quite remarkable that so few of his observations have been anticipated during the intervening years, though the publications of Joubin and Blochmann have indeed covered many of the details relating to *Lingula* and *Discinisca.*

Morse's observations refer principally to the genera *Lingula, Glottidia, Discinisca, Hemithyris, Dallina, Terebratalia* and *Terebratulina.* The points of especial interest comprise the discussion of the otocysts, pharyngeal glands, the accessory hearts of Hancock, the strand-like spermaries, the pallial circulation, the life attitudes of different forms, and particularly the varied and graceful movements of the brachia. The strand-like spermaries and the pharyngeal glands are characters heretofore undescribed, and further details are given regarding the external glands first described by the author. The presence of otocysts in *Lingula* and *Glottidea* are definitely shown although Blochmann has doubted their existence in these genera. The organs described by Hancock as the 'heart' and the 'accessory hearts' have been frequently investigated by various observers, but no final conclusion has been reached. The author shows that they cannot well belong to the circulatory system, but must be regarded as in some way connected with the genitalia, though their precise functions have not been determined. The plates accompanying this memoir were drawn by the author in his usual clear and artistic manner. They represent just what is intended to be shown, and are evidently depictions of natural objects.

Conklin's embryology of *Terebratulina septentrionalis* (2) presents an excellent illustration of the results obtained by modern methods. Owing to the opacity of the embryos and to the absence of serial sections, good microtomes and other accessories, Morse during 1871–73 was able to show mainly the external modifications in the developing embryo. His observations, however, were very thorough and complete.

Conklin describes in detail the egg and its cleavage, gastrulation and the formation of the body layers and cavities, the orientation of the embryo, and the development and organization of the larva.

The constrictions of the cephalula, hitherto supposed to mark distinct segments, are shown to be produced by the anterior and posterior mantle furrows, but at no time do they form true septa dividing the coelom. The author, after reviewing the real and supposed resemblances between the larval and embryo brachiopods and other organisms, concludes that the relationship between *Phoronis,* the Bryozoa, and the Brachiopoda, is sufficiently close to warrant their being placed in the same phylum, though not in the same class.

All our knowledge regarding the embryology of the Brachiopoda has hitherto practically been confined to the group known as Articulata. The work of Yatsu (3) is, therefore, of great interest and value, since it relates to *Lingula,* the living and almost unchanged representative of the most ancient types. The developmental characters of *Lingula* are in many respects quite different from those of any brachiopod previously studied. The three-lobed cephalula stage of the neoembryo, so characteristic of *Cistella, Lacazella* and *Terebratulina,* is not developed in *Lingula,* which does not attain more than a two-lobed condition. Also, the posterior lobe is not the caudal as in those genera, but constitutes the thoracic division. *Cistella, Lacazella,* etc., undergo a metamorphosis in passing from the neoembryonic to the typembryonic condition, consisting of the reflexing of the mantle lobes forward over the anterior division. This change is absent in *Lingula,* and the mantle lobes simply grow anteriorly. This difference has an especial significance in the development of the shell, for in *Cistella,* etc., the shell is developed from what was originally the inner side of the mantle lobes, while in *Lingula* it is secreted by the outside. The author further considers that the pedicle is embryologically and morphologically distinct from the pedicle of the articulate brachiopods.

The embryonic and early post-embryonic stages are fully described, together with full details and illustrations of the various organs and structures. As a whole, no single species of brachiopod has heretofore received so complete and extended treatment along these lines of research.

The two other papers by this author (4, 5) relate to the histology and habits of *Lingula.* New facts are given, showing the extraordinary power of resistance to unfavorable conditions, which has doubtless been a potent factor in preserving the genus since Cambrian times.

It is noteworthy that in all the standard literature on the Brachiopoda no notice has been taken of the earliest American publication relating to the anatomy of these animals. It is contained in a 'Text-book of Vegetable and Animal Physiology,' by Henry Goadby, published in New York in 1858. One chapter is devoted to the nutrition in the Brachiopoda and another to a description of their nervous and circulatory systems. Inasmuch as Goadby's observations were based upon original dissections and studies, their claims for a place in the literature of brachiopod research are perfectly valid.

C. E. BEECHER.

General Investigations of Curved Surfaces. By KARL FRIEDRICH GAUSS. Translated with Notes and a Bibliography by JAMES CADALL MOREHEAD, A.M., M.S., and ADAM MILLER HILTEBEITEL, A.M. The Princeton University Library. 1902. Quarto. Pp. viii + 127.

By the liberality of the Princeton Library Publishing Association and the alumni of

Princeton University this book is sold at less than the cost of publication. English-speaking mathematicians will be certainly grateful for the public spirit shown by Princeton University and its alumni. While it is true that most mathematicians can read memoirs in foreign languages, yet its difficulty often deters them from doing so when they are not directly interested in the subject. There is an ease in one's own idiomatic forms of expression which makes the reading much pleasanter, and if to such translations are added notes of interest and bibliographies of value, then their usefulness is unquestionable. One likes to add such works to one's own library where they can be an incentive to a broader knowledge. Similar translations to the one in hand, such as of the work of Lie which leads up to and includes his theory of transformation groups, would be equally valuable and acceptable.

The translators present us first with Gauss's paper of 1827, and his own abstract of the same. Here, in 47 pages, is the original development of the theory of surfaces, relating principally to questions of curvature, treated mainly by Gauss's own method of curvilinear coordinates, which formed the source of many remarkable thorems, such as that the measure of curvature of a surface remains unchanged by bending it without stretching or breaking. The notes to this paper occupy 28 pages, and give historical information, explanations and omitted figures and proofs of many theorems.

Next follows the paper of 1825, which was not published until after the death of Gauss. It is his less finished and incomplete first paper on the subject. Curvilinear coordinates are not used; there is an introduction which treats of curvature in a plane; and, altogether, it shows the manner in which many of the ideas of the more complete paper were evolved. There are 29 pages in this paper, followed by 4 pages of notes. Then comes a bibliography of 11 pages, containing 343 titles, which is limited to works which use Gauss's methods in the subjects of curvilinear coordinates, geodesic and isometric lines, curvature, deformation, orthogonal systems, and the general theory of surfaces, but not including minimal surfaces, congruences, etc. A few corrections of misprints and an additional note appear on the last page.

It seems unnecessary to give this review a learned appearance for the readers of SCIENCE, by entering into a discussion of details of theorems and formulas. The work of Gauss is of primary importance in the theory of surfaces, and these papers are classical in the subject. What I wish is to note the usefulness and importance of this translation of the work of an original master to all who desire to study the subject, and to express what I conceive to be the general obligations of American mathematicians to the translators for their careful labors and to Princeton University and its alumni for their thoughtfulness and generosity in its publication.

ARTHUR S. HATHAWAY.

Acht Vorträge über Physikalische Chemie, gehalten auf Einladung der Universität Chicago. By PROFESSOR J. H. VAN'T HOFF. Braunschweig, F. Vieweg and Sohn. 1902.

Nothing written by the great master of modern physical chemistry can fail to be of interest and value. The excellently lucid treatment of the subject to be seen in these lectures will undoubtedly assist in dispelling that remnant of distrust concerning the new chemistry which still sometimes lurks in conservative minds. To those conversant with the author's other works, these lectures will bring nothing new except the details of their presentation, which covers a wide field with the help of a few typical examples. The lectures treat in succession the relation of physical chemistry to pure chemistry (especially inorganic), to technical chemistry, to physiological chemistry and to geology. They call attention in a striking manner to the far-reaching influence of the new ideas. Among other examples the phase relations of iron and steel, and of carnallite, are discussed in detail in their appropriate places, and the fundamental importance of osmotic phenomena and of enzymes is especially emphasized in the two chapters upon physiological chemistry. To Americans these lectures are especially interesting because of their having formed one of the chief reasons for Dr. van't Hoff's welcome visit to the United States in 1901.

THEODORE W. RICHARDS.

SOCIETIES AND ACADEMIES.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE fifty-second annual meeting of the American Association for the Advancement of Science, and the first of the Convocation Week meetings, will be held in Washington, D. C., December 27, 1902, to January 3, 1903. The retiring president is Professor Asaph Hall, U.S.N., and the president elect, President Ira Remsen, Johns Hopkins University. The permanent secretary is Dr. L. O. Howard, Cosmos Club, Washington, D. C., and the local secretary, Dr. Marcus Benjamin, Columbian University, Washington, D. C. President Roosevelt is honorary president of the local committee. The preliminary program with information in regard to hotel headquarters, railway rates, etc., will be found in the issue of SCIENCE for November 21. The following scientific societies will meet at Washington in affiliation with the Association:

The American Anthropological Association will hold its first regular meeting during Convocation Week in affiliation with Section H of the A. A. A. S. President, W J McGee; secretary, George A. Dorsey, Field Columbian Museum, Chicago, Ill.

The American Chemical Society will meet on December 29 and 30. President, Ira Remsen; secretary, A. C. Hale, 352A Hancock street, Brooklyn, N. Y.

The American Folk-lore Society will meet in affiliation with Section H of the A. A. A. S. President, George A. Dorsey; vice-presidents, J. Walter Fewkes, James Mooney; secretary, W. W. Newell, Cambridge, Mass.

The American Microscopical Society will probably hold a business meeting on December 29. President, E. A. Birge, Madison, Wis.; secretary, H. B. Ward, University of Nebraska, Lincoln, Nebr.

American Morphological Society will meet on December 30 and 31. President, H. C. Bumpus; vice-president, G. H. Parker; secretary and treasurer, M. M. Metcalf, Woman's College, Baltimore, Md.

The American Philosophical Association will meet on December 30 and 31 and January 1. Secretary, H. N. Gardiner, Northampton, Mass.

The American Physical Society will meet in affiliation with Section B of the A. A. A. S. President, Albert A. Michelson; secretary, Ernest Merritt, Cornell University, Ithaca, N. Y.

The American Physiological Society will meet on December 30 and 31. President, R. H. Chittenden; secretary, F. S. Lee, Columbia University, New York, N. Y.

American Psychological Association will meet on December 30 and 31 and January 1. President, E. A. Sanford; secretary and treasurer, Livingston Farrand, Columbia University, New York, N. Y.

American Society of Naturalists will meet on December 30 and 31. President, J. McK. Cattell; vice-presidents, C. D. Walcott, L. O. Howard, D. P. Penhallow; secretary, R. G. Harrison, Johns Hopkins University, Baltimore, Md.

Association of American Anatomists will meet on December 30 and 31. President, G. S. Huntington; vice-president, D. S. Lamb; secretary and treasurer, G. Carl Huber, University of Michigan, Ann Arbor, Mich.

Association of Economic Entomologists will meet on December 26 and 27. President, E. P. Felt; secretary, A. L. Quaintance, College Park, Md.

Astronomical and Astrophysical Society of America will meet during Convocation Week, in affiliation with Section A of the A. A. A. S. President, Simon Newcomb; secretary, George C. Comstock, University of Wisconsin, Madison, Wis.

Botanical Society of America will meet on December 31 and January 1. President, B. T. Galloway; secretary, D. T. MacDougal, New York City.

Botanists of the Central and Western States will meet on December 30. Committee in charge of the meeting, John M. Coulter, University of Chicago; D. M. Mottier, University of Indiana, Bloomington, Ind.; Conway MacMillan, University of Minnesota, Minneapolis, Minn.

Geological Society of America will meet on December 29, 30 and 31. President, N. H. Winchell; vice-presidents, S. F. Emmons, J. C. Branner; secretary, H. L. Fairchild, University of Rochester, Rochester, N. Y.

The National Geographic Society will hold a meeting during Convocation Week. President, A. Graham Bell; vice-president, W J McGee; secretary, A. J. Henry, U. S. Weather Bureau, Washington, D. C.